



Investigating Students' Perceptions of Team-Based Projects and TPACK Integration in English Language Learning

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Abstract: This study explores students' perceptions of team-based project learning integrated with Technological Pedagogical Content Knowledge (TPACK) in an English Teaching Methodology class at Universitas Syiah Kuala. The research framework, adapted from Ministry of Education and Culture (Kemendikbud), focuses on six key stages: questioning, designing, scheduling, monitoring, assessing, and evaluating. Data were gathered from 30 students through a structured questionnaire and analyzed quantitatively, using percentage and interval ranges to determine perceptions. The results show that students held overwhelmingly positive views of team-based projects, with mean scores consistently falling in the 'Agree' to 'Strongly Agree' categories. Students valued the collaborative nature of the projects, which helped them develop critical skills such as critical thinking, creativity, and time management. The integration of TPACK further enriched students' learning experience by facilitating meaningful application of technology in teaching. These findings suggest that team-based projects, when integrated with TPACK and guided by a structured framework, can significantly improve learning outcomes in English language education. Future research should investigate the long-term impacts of these approaches and address potential implementation challenges to enhance the effectiveness of the approaches.

Keywords Perception; students' experiences; team-based project; TPACK.

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INTRODUCTION

Effective learning occurs when students can comprehend the material presented and apply it in their daily lives (Shah, 2019). However, many schools have yet to achieve this standard, as the education students receive often revolves around theory and rote memorization, which can easily fade over time. Traditional classroom activities are predominantly teacher-centered, with students passively listening to lectures. Their primary tasks involve taking notes and memorizing concepts presented by the teacher, leading to minimal student engagement and creativity. This lack of active participation can result in boredom and insufficient knowledge acquisition (Ngereja et al., 2020). Therefore, it is necessary to implement effective teaching strategies and models to achieve national education goals. To meet national education objectives, it is essential to implement effective teaching strategies and models. Teachers aim to foster an active and creative learning environment that enhances students' motivation to learn. One such model that can be employed is the team-based project (Suriaman et al., 2024; Zaky, 2022).

Team-based project, also known as project-based learning, follows a similar concept. We can consider team-based project as an updated version of project-based

learning. When implementing a team-based project in the classroom, lecturers use project-based learning theory as a reference. This learning model is entirely focused on student activities rather than teacher-driven instruction (Iserte et al., 2022; Suriaman et al., 2024). Through authentic and relevant real-world problem-solving tasks, team-based projects help students gain a deep understanding and retain information (Almazroui, 2022). Students take an active role in their own learning process when participating in a team-based project. Du Toit-Brits (2019) mentions that team-based projects provide students with the tools they need to take charge of their education by encouraging self-directed learning and fostering a sense of autonomy.

To enhance the effectiveness of team-based projects and fully realize their potential, integrating them with innovative frameworks like TPACK is crucial (Vijayatheepan, 2025). TPACK-based learning complements team-based projects by providing a structured approach to incorporating technology and pedagogy into content delivery (Oktaviani & Utami, 2024). The TPACK framework offers a holistic approach that not only considers the content to be taught but also how it can be delivered using appropriate pedagogical strategies and technological tools. This integration ensures that educators are not merely transmitting information but are also facilitating an engaging and interactive learning environment. By doing so, students are better equipped to understand and apply knowledge in various contexts, making the learning experience more relevant and effective (Vijayatheepan, 2025).

Moreover, the combination of team-based projects with TPACK allows for a more personalized learning experience, as technology can be used to differentiate instruction and meet the diverse needs of students. This integration supports various learning styles and paces, ensuring that each student can engage with the material in a way that is most effective for them. Additionally, it allows learners to cultivate critical thinking, foster creativity, enhance collaboration, and improve communication skills (Misla & Mawardi, 2020), all of which are essential for success in the modern workforce. By aligning team-based projects with TPACK, educators can create a learning environment that not only motivates students but also prepares them for the complexities and challenges of the real world, equipping them with the knowledge and skills needed to thrive in a rapidly changing society. Overall, the implementation of team-based projects and TPACK can significantly impact students' motivation and enthusiasm for learning (Madjid et al., 2024).

Furthermore, this integration fosters adaptability in the educational process. Embracing TPACK-based learning allows for the design of instruction that is flexible and responsive to individual student needs. In an era where digital literacy is increasingly important, integrating technology into the curriculum helps bridge the gap between theoretical knowledge and practical application (Chudzaifah & Nailil Hikmah, 2024). This approach not only enhances student engagement but also prepares them for the demands of the modern world, where technology and innovation play a crucial role in personal and professional success.

Building on these perspectives, the present study addresses a gap in the existing research by investigating students' perceptions of team-based projects with TPACK integration, specifically focusing on six indicators adapted from Kemendikbud (2014): questioning, designing, scheduling, monitoring, assessing, and evaluating. While previous studies, such as those by Smith and Becker (2021) and Johnson (2020), have explored the benefits of team-based projects and TPACK integration in enhancing student engagement, communication skills, and overall learning experiences, they primarily concentrated on

broader outcomes like motivation and academic achievement. Similarly, research by Chen et al. (2022), Kim and Kwon (2023), and Miguel-Revilla et al. (2019) examined specific language skills, such as speaking and writing, within the context of TPACK and team-based projects. However, none of these studies have investigated into the detailed process-oriented aspects of how students perceive and engage with the various stages of team-based projects. This study aims to fill this gap by providing a better understanding of students' experiences across the six indicators, offering insights into how these components contribute to the effectiveness of TPACK-integrated team-based learning in English language education. Based on this background, this study formulates its research question as: "What are students' perceptions of the implementation of Team-Based Projects and TPACK integration in learning English?"

Team-Based Project

As Aristin and Purnomo (2022) describe, a Team-Based Project involves a collaborative effort where a group of individuals works together towards a shared goal or objective. In such projects, each team member contributes their skills, expertise, and efforts to achieve the desired outcome. Team-Based Projects typically involve tasks that are too complex or extensive for a single person to complete alone, necessitating coordination, communication, and cooperation among team members.

The procedure for implementing a team-based project consists of several critical steps to ensure clarity, organization, and collaboration. According to Mardhotillah and Kholijah (2020), these steps include defining the project scope and objectives, detailing the timeline, and providing explicit instructions to team members to ensure the project meets expected outcomes. The next step involves formulating a project plan, which includes tasks, milestones, and deadlines, and ensuring clear communication and responsibility allocation to maximize outcomes. Effective collaboration and communication guidelines are also essential, followed by task execution, monitoring, quality assurance, review, adjustments, and, finally, project closure and evaluation.

Technological Pedagogical Content Knowledge (TPACK)

TPACK (Technological Pedagogical Content Knowledge) is a comprehensive framework that integrates three critical areas of knowledge essential for effective teaching with technology: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) (Dewi et al., 2022). The integration of these domains enables educators to create meaningful and impactful teaching and learning experiences. Functional planning within the TPACK framework involves the careful alignment of technological tools and resources with pedagogical strategies and content objectives, which in turn enhances learning outcomes. By utilizing TPACK, teachers can scaffold students' digital literacy skills, design authentic learning tasks, and tailor instruction to accommodate diverse student needs, creating an inclusive and adaptive educational environment. Additionally, incorporating functional planning as a metacognitive strategy fosters a structured approach to learning, empowering students to set goals, organize tasks, and allocate resources effectively. This strategic planning nurtures a culture of self-regulated learning, collaborative problem-solving, and technological innovation (Absari et al., 2020), preparing students for the challenges of the modern world.

Technological Knowledge (TK) refers to an educator's ability to use a wide range of technologies effectively, from traditional tools like chalkboards to advanced software and

digital devices. TK encompasses the knowledge of how to operate these tools, solve problems, and apply technologies in various educational contexts (Zaeni et al., 2021). Pedagogical Knowledge (PK), on the other hand, relates to understanding the processes of teaching and learning. It involves instructional methods, classroom management techniques, and assessment strategies that promote student engagement and comprehension. Teachers with strong PK can adapt their teaching methods to meet the needs of diverse learners, fostering an environment that encourages critical thinking and deep subject understanding (Candra et al., 2020). Content Knowledge (CK) represents a teacher's in-depth understanding of the subject matter they are teaching, including the facts, theories, concepts, and principles within a specific discipline. CK equips teachers to present content accurately, anticipate potential student misconceptions, and respond effectively to student inquiries, contributing to a more robust learning experience (Purnawati et al., 2020).

Pedagogical Content Knowledge (PCK) combines both pedagogical expertise and content mastery, focusing on the most effective ways to teach specific content. According to Wulandari et al. (2018), PCK involves selecting appropriate instructional strategies to convey subject matter clearly and addressing common student misconceptions in the process. This combination allows educators to tailor their instruction to meet the diverse learning needs of students while ensuring that the content is delivered in an accessible and engaging manner. By leveraging the intersection of TK, PK, and CK within the TPACK framework, teachers can enhance their instructional effectiveness, ultimately improving student learning outcomes and fostering a deeper understanding of both content and technology in the classroom.

METHOD

This study employed a qualitative research approach using a questionnaire to explore students' perceptions of learning through the integration of the Team-Based Project model with the TPACK framework. Structured data were gathered using questionnaires and the results were presented with graphs to enhance clarity and facilitate understanding and describe narratively then.

Population and Sample

The study's population consisted of fourth-semester students enrolled in the English Teaching Methodology class at Universitas Syiah Kuala. Among this population, four groups were identified, and a sample of 30 students was selected using purposive sampling. This sampling technique was specifically chosen to ensure that the participants were representative of classes that had integrated team-based projects with TPACK into their learning process. The purposive approach ensured the relevance and applicability of the collected data to the study's objectives.

Research Instrument and Data Collection

The primary research instrument used was a questionnaire adapted from Ministry of Education and Culture (Kemendikbud) (2014), focusing on six key indicators: questioning, designing, scheduling, monitoring, assessing, and evaluating. These indicators were designed to capture a comprehensive view of students' perceptions regarding the integration of team-based projects with TPACK. Data were collected from 30 students enrolled in the English Teaching Methodology class at the English Department of

Universitas Syiah Kuala. During these sessions, the questionnaire was distributed in the classroom to ensure a high response rate and immediate data collection.

Data Analysis

The data analysis process involved calculating the percentage of respondents who expressed agreement, neutrality, or disagreement regarding the implementation of team-based projects and TPACK integration. The percentage formula $P=(f/N) \times 100\%$ was applied to determine these proportions. Additionally, interval data analysis (Anwar, 2009), was used to interpret whether students had a positive or negative perception of the educational strategies.

Table 1: Interval Data Analysis

Category	Indicator
Very Agree	$4,5 \leq n \leq 5$
Agree	$3,5 \leq n \leq 4,4$
Neutral	$2,5 \leq n \leq 3,4$
Disagree	$1,5 \leq n \leq 2,4$
Very Disagree	$0 \leq n \leq 1,4$

The final interpretation of the data provided perceptions into the effectiveness of these methods in enhancing English language learning.

RESULT AND DISCUSSION

Figure 1 presents the results of the study, which focuses on students' perceptions of team-based project learning integrated with TPACK. The findings are organized qualitatively according to the six key components identified by Kemendikbud (2014): questioning, designing, scheduling, monitoring, assessing, and evaluating.

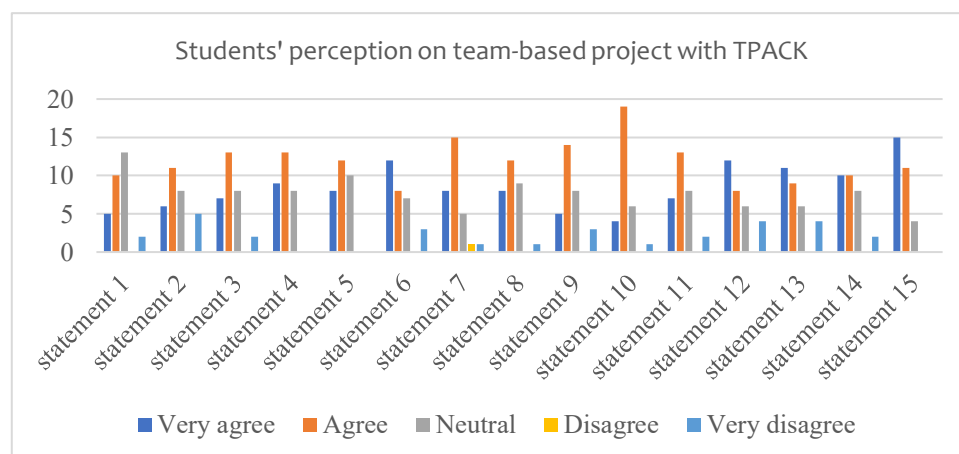


Figure 1. The results of the study.

Data were collected from 30 students in the English Teaching Methodology class at Universitas Syiah Kuala, and the students' responses were categorized into five levels: Very Agree (VA), Agree (A), Neutral (N), Disagree (D), and Very Disagree (VD).

Questioning

In the "Questioning" component, the first statement revealed that 15 students either "Very Agree" or "Agree" that brainstorming helped activate prior knowledge and

motivated further learning, with 13 students remaining neutral and only 2 disagreeing. The second statement indicated that 17 students found that the driving question kept them focused and relevant, with 8 neutral responses and 5 disagreements. These results suggest that questioning strategies effectively engage students, although some remain unsure or unconvinced. Based on the responses to the first and second statements, the average score was 4.5, indicating a generally positive response. Most students selected “Agree” on both statements, reflecting that brainstorming assists in activating their prior knowledge and interest, and motivates them to research deeper into the subject. Consequently, the driving questions in questioning help maintain students’ focus on the project. Overall, students recognize that questioning can stimulate prior knowledge and interest, and keep them engaged in their projects.

Designing

The “Designing” component exhibited generally positive responses. For instance, 20 students agreed that discussing project steps helped them take ownership, and 22 students felt that collaboration skills improved through group work. While teacher assistance was valued, with 20 students agreeing that it encouraged creativity, opinions on time consumption were mixed. Specifically, 23 students felt that designing took too much time, while 6 were neutral or disagreed. These results indicate that although the design phase fosters collaboration and creativity, it can be time-intensive. According to the questionnaire results, the average response score was 4.5, signifying a positive perception of this component. Most students selected “Agree” on both statements, suggesting that discussing project steps helps them take ownership and enhances collaboration skills. However, the time required for designing projects can be challenging for microteaching students due to limited time constraints.

Scheduling

In the “Scheduling” component, students provided positive feedback on the effectiveness of project scheduling in improving organizational skills and time management. Specifically, 20 students agreed that guiding them through project creation enhanced their ability to organize their work, while 24 students noted that discussing project timelines contributed to better time management. This suggests that structured scheduling is instrumental in helping students allocate time efficiently and manage their tasks effectively. The average response score for scheduling was 4.5, indicating that the majority of students found the scheduling activities beneficial for their learning process.

The high level of agreement highlights the value of incorporating clear timelines and structured planning into project-based learning. By discussing deadlines and setting schedules, students were able to practice essential organizational skills and improve their ability to manage their time. For future implementations, it is crucial for microteaching students, as prospective educators, to ensure that their students are equipped with effective time management strategies to complete their projects successfully. This approach not only supports students in meeting their deadlines but also fosters a disciplined approach to project management.

Monitoring

The “Monitoring” component revealed that students valued the role of teacher oversight in fostering independence and discipline. According to the results, 20 students

agreed that teacher monitoring effectively promoted these qualities during the project work. The average response score for monitoring was 4.5, reflecting a positive perception of the monitoring practices. Students acknowledged that the presence of teacher supervision helped them remain focused and adhere to project requirements, enhancing their overall performance.

However, the findings also indicated some challenges associated with monitoring. While the majority of students benefited from the structured oversight, some experienced difficulties in gathering information and demonstrated varying levels of participation in group activities. These issues underline the need for continuous teacher engagement and support to address students' challenges and ensure active participation. Future educators must be prepared to manage these dynamics effectively, providing additional assistance where needed and maintaining an environment that encourages all students to contribute actively to their projects.

Assessing

The "Assessing" component garnered generally positive feedback from students, indicating the effectiveness of assessment methods in measuring understanding and supporting learning. A total of 20 students found peer assessment to be helpful, though 6 students remained neutral, and 4 students disagreed. This suggests a mixed reception to peer assessment, with a substantial portion of students recognizing its benefits in evaluating their work. Additionally, 20 students felt that the feedback received through assessments effectively measured their understanding of the projects. The average response score for the assessing component was 5, with most students selecting "Very Agree" (VA) on the statements, reflecting an excellent or very positive reception.

The positive responses highlight that assessment plays a crucial role in helping students gauge their achievements and plan future learning strategies. Feedback from assessments not only provides insights into students' understanding but also aids in identifying areas for improvement. By measuring their progress, students can better prepare for subsequent learning activities. Overall, the findings affirm that assessment methods used in this study were effective in enhancing students' comprehension and facilitating their academic growth.

Evaluating

In the "Evaluating" component, students responded favorably to the evaluation methods implemented during the project-based learning process. A significant number of students, 20 in total, agreed that teacher guidance in self-assessment improved their performance. Additionally, 26 students felt that the experience of project preparation significantly enhanced their learning. The average response score for evaluation was 5, indicating that most students selected "Very Agree" (VA) for the evaluation statements, demonstrating a high level of satisfaction with the evaluation practices.

These findings suggest that the evaluation process, which included opportunities for self-assessment and public presentation of the final project, was effective in motivating students and enhancing their learning experiences. The opportunity to present their work to a wider audience, including peers, teachers, and family, served as a significant motivator and source of satisfaction. Furthermore, engaging in discussions with teachers to improve performance and addressing initial learning issues contributed to a deeper understanding of the project and maintained high levels of student motivation. Overall, the evaluation

methods employed were instrumental in developing student engagement and promoting a sense of accomplishment.

RESULT AND DISCUSSION

Several studies have explored the impact of integrating TPACK (Technological Pedagogical Content Knowledge) into team-based projects within English language education. Smith and Becker (2021) conducted a study on the impact of team-based projects on student learning in college English classes, revealing significant findings about the benefits of such projects. Their research indicated that team projects not only increased student engagement but also contributed to the development of communication skills. Furthermore, they observed that the integration of technology, particularly through online collaboration tools, made the learning experience more interactive and dynamic. The study concluded that incorporating TPACK (Technological Pedagogical Content Knowledge) into team-based projects positively influences student motivation and academic achievement in English language learning. This research provides a foundational understanding of how team-based projects and technology integration can enhance educational outcomes, though it primarily addresses the broader impacts rather than the specifics of TPACK components.

Johnson (2020) extended the exploration of team-based projects to a one-year longitudinal study focused on high school students' English language skills. Their research highlighted those collaborative approaches, including group discussions and problem-solving, facilitated a deeper understanding of the material. Teachers who effectively employed the TPACK framework were more successful in integrating technology and pedagogy, thus enhancing their teaching effectiveness. While this study provides valuable longitudinal insights into the benefits of team-based projects and TPACK, it does not fully explore how different components of TPACK specifically influence long-term learning outcomes.

Chen et al. (2022) examined TPACK integration in team-based projects within English classes in China, finding notable improvements in students' communication skills and motivation due to the effective use of technological tools. They recommended increased teacher training and the provision of additional technological resources to maximize the benefits of team-based projects. This research stresses the importance of both technology and teacher preparedness in enhancing student outcomes but does not address how individual pedagogical strategies within TPACK contribute to these improvements.

Kim and Kwon (2023) investigated the effect of TPACK-integrated team-based projects on elementary students' English-speaking skills in South Korea. Their study demonstrated that students gained confidence and improved their speaking abilities through a supportive and interactive team environment. The use of technology, such as voice recognition apps, played a crucial role in allowing students to practice speaking and receive immediate feedback. Similarly, Miguel-Revilla et al. (2019) and Mai, et al. (2022) explored the effectiveness of TPACK-integrated team-based projects on college students' writing skills and high school students' collaborative skills, respectively. Both studies highlighted the positive outcomes of this approach but pointed to the need for more comprehensive understanding of how different TPACK components interact to enhance various aspects of language learning.

In conclusion, the literature consistently highlights the significant benefits of integrating TPACK into team-based project learning models in English language education. This integration fosters dynamic learning environments that enhance collaboration, critical thinking, and practical language application. Research demonstrates that TPACK integration not only boosts student engagement and motivation but also supports the development of essential 21st-century skills such as problem-solving and communication. Despite these advantages, there is a clear need for further investigation into the specific processes and perceptions of students engaged in TPACK-integrated team-based projects. Therefore, this study aims to address these gaps by providing a more detailed understanding of how these educational strategies contribute to improved language learning outcomes and better prepare students for the demands of the modern world.

In consistent to the previous studies, the present study also highlights students' positive perceptions of team-based project learning combined with Technological Pedagogical Content Knowledge (TPACK). The analysis of questionnaire data reveals that students view the "Questioning" component favorably, with an average score of 4.5. This suggests that brainstorming activities effectively activate prior knowledge and motivation, while the driving question helps students focus on real-life problems, thereby fostering active and successful problem-solving (Misa & Neno, 2023). These findings align with the objectives of team-based learning, which aims to engage students and enhance their critical thinking skills.

Moving to the "Designing" component, students also responded positively, with an average score of 4.5. The data indicate that involving students in the design process promotes collaboration, creativity, and a sense of ownership. This is consistent with Alyani and Ratmanida (2021) study, which emphasizes the importance of student involvement in planning and decision-making to boost engagement and responsibility.

The "Scheduling" and "Monitoring" components also received positive feedback. Students appreciated the clear timelines and guidance provided by teachers, which helped them stay organized and on track with their projects. Monitoring, with an average score of 4.5, was particularly effective in promoting independence and discipline among students. However, some students struggled with gathering information and required additional support to fully benefit from the project-based learning approach. These findings point out the importance of ongoing teacher involvement and scaffolding to support all students in the learning process.

Finally, the "Assessing" and "Evaluating" components were well-received, with students valuing the feedback and opportunities for self-reflection. Positive responses to peer assessment and self-assessment highlight the value of these methods in promoting student growth and understanding. As noted by Aldabbus (2018) and supported by Alyani and Ratmanida (2021), evaluation plays a crucial role in encouraging students to critically reflect on their work, contributing to their overall development and success in team-based project learning. The findings of this study are consistent with previous research (Adams, 2018; Habók & Nagy, 2016; Susanti et al., 2020), which also reported positive experiences with team-based project learning and TPACK integration.

In conclusion, the study reaffirms the effectiveness of team-based project learning combined with TPACK in enhancing student engagement, collaboration, and language skills. The positive student perceptions align with prior research by Johnson (2020), Chen et al. (2022), Miguel-Revilla et al. (2019), and Mai et al. (2022), which collectively highlight the benefits of integrating TPACK into team-based projects. However, the study also

identifies areas for improvement, such as managing the time demands of project design and ensuring all students receive adequate support. Overall, the integration of TPACK principles in team-based project learning offers significant advantages, provided that implementation strategies are carefully considered and adapted to meet students' needs.

The integration of Technological Pedagogical Content Knowledge (TPACK) into team-based project learning models has proven highly beneficial for pre-service teachers. Research shows that these models significantly enhance ICT skills, TPACK competencies, and positive attitudes toward technology integration (Alayyar et al., 2011). For example, the Project-Based Scaffolding TPACK model has been effective in improving both the learning design abilities and TPACK knowledge of pre-service science teachers (Dewi et al., 2022). These models also create authentic learning environments that promote self-regulated learning and collaboration, helping pre-service teachers develop practical skills in educational technology (Yurniwati & Utomo, 2022). Despite these advantages, challenges such as developing pedagogical abilities and gaining confidence in assessing learning outcomes still persist (Ekawati & Prastyo, 2022).

The integration of Technological Pedagogical Content Knowledge (TPACK) in teacher education faces various obstacles. Instructors often struggle with misconceptions about how to use technology effectively in teaching, and the fast pace of technological advancements makes it challenging to keep their skills updated (Talib et al., 2016). Pre-service teachers also face difficulties in project-based activities within pedagogical makerspaces, particularly when it comes to teamwork and task coordination (Max et al., 2023). However, authentic learning experiences such as training, microteaching, and collaborative lesson design can help develop TPACK competencies and boost confidence among pre-service teachers (Kafyulilo, 2012). First-year pre-service teachers frequently find it difficult to grasp pedagogical knowledge, which is essential for TPACK growth (Valtonen et al., 2020). Nevertheless, research shows that project-based activities in pedagogical makerspaces can enhance TPACK skills and foster positive attitudes toward the use of ICT in education (Max et al., 2023). TPACK facilitates differentiated instruction, allowing educators to tailor teaching methods and technological applications to meet diverse student needs (Hardanti et al., 2024). Overcoming these challenges is crucial for strengthening TPACK integration in teacher education programs.

CONCLUSION

Based on the findings of this study, it can be concluded that the integration of team-based projects with Technological Pedagogical Content Knowledge (TPACK) in the English Teaching Methodology class was perceived positively by students. The average scores for indicators such as questioning, designing, scheduling, monitoring, assessing, and evaluating consistently fell within the 'Agree' to 'Very Agree' categories, suggesting that students valued these projects for enhancing their learning experience. They particularly appreciated how the structured approach of team-based projects helped them activate prior knowledge, collaborate effectively, and develop essential skills like time management, creativity, and independent learning. The incorporation of TPACK enriched these experiences by enabling students to apply technological tools in ways that supported their language learning and pedagogical skills. The study also highlights the importance of involving students in the design and decision-making processes of the projects, which increased their sense of ownership and responsibility and deepened their engagement with the material. While the results are promising, they reveal areas needing

improvement, such as addressing the time-intensive nature of project design and providing additional support for students facing challenges. Overall, these positive outcomes align with existing research on the benefits of team-based projects and TPACK integration in language education, indicating that thoughtful implementation can significantly enhance students' learning outcomes and overall experiences. This study's findings are based on a specific context and sample size, which may limit the generalizability of the results. Future research should explore the impact of varying levels of technological proficiency on students' experiences with team-based projects and TPACK integration.

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